

SaskPower

CLIMATE
CHANGE
ACTION
PLAN



[1998/99 UPDATE]

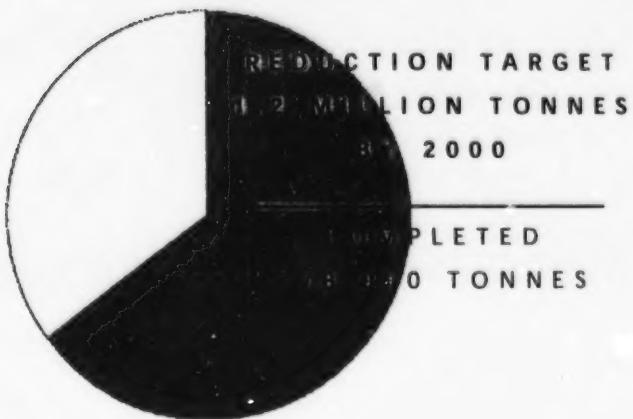
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Climate Change Action Plan, contact:
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*S*askPower serves more than 420,000 customers over an area
of half a million square kilometres of diverse terrain.

We maintain more kilometres of power lines than any other
western Canadian utility. Four thermal, seven hydro-electric
and three natural gas turbine stations supply economical,
dependable power 24 hours a day, 365 days a year.

SaskPower is committed to balancing province-wide energy
needs with a sustainable environment.

CLIMATE CHANGE SUMMARY



By improving the efficiency of our generation, transmission and distribution, and investing in offsets, SaskPower has reduced emissions by over 778,000 tonnes of CO₂

A BALANCED APPROACH

SaskPower is one of the first corporations to take voluntary action to limit or reduce greenhouse gas emissions through Canada's Voluntary Challenge and Registry (VCR). This progress update is SaskPower's fifth to the VCR since 1995.

SaskPower has taken a multifaceted approach to our climate change goal and we are on target to achieve a reduction of 1.2 million tonnes by the year 2000. In 1998, we reduced or offset over 778,000 tonnes of greenhouse gas emissions. We continue to improve the efficiency of our operations, work with our customers to find energy savings and invest in carbon dioxide (CO₂) offset projects.

Our action plan is currently under review as we define our reduction targets beyond 2000. We remain committed to a balanced approach — one that addresses greenhouse gas emissions while still responding to the province's growing energy needs.

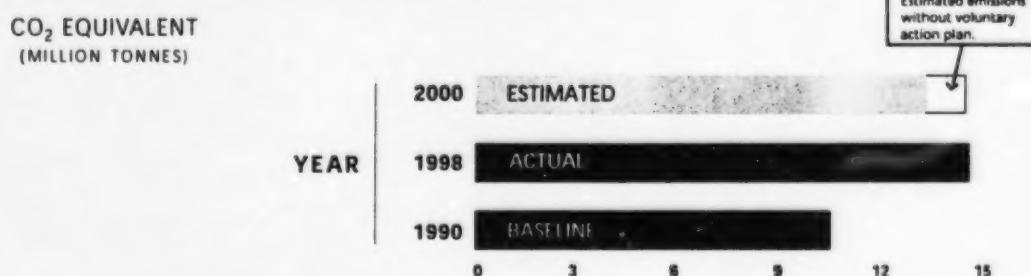
John Wright
President & CEO
SaskPower

METHODOLOGY

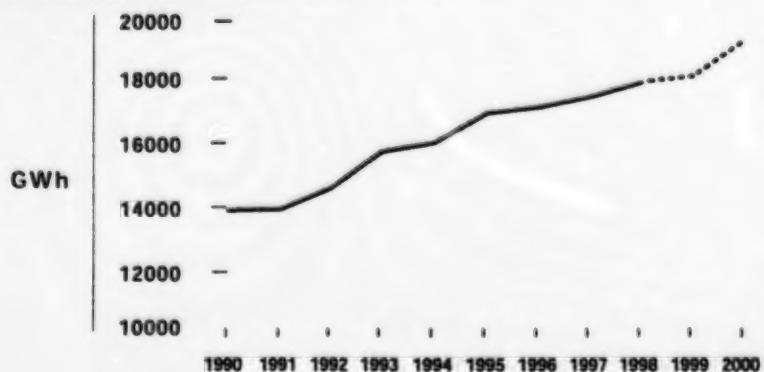
The amount of fossil fuel used at SaskPower's thermal generating stations is the base for calculating greenhouse gas emissions. Greenhouse gases directly emitted by SaskPower's facilities consist primarily of CO₂ (97.6%), with the remainder consisting of methane (CH₄) and nitrous oxide (N₂O).

- CO₂ emissions are estimated by multiplying the amount of fossil fuel — coal, natural gas or oil — used at each thermal station by the amount of carbon estimated to be in that fossil fuel. The total carbon produced by the station is then converted into an equivalent CO₂ amount.
- SaskPower's CH₄ and N₂O emissions are primarily related to technology and combustion conditions. Emissions are estimated by multiplying the amount of fuel burned at a station by an emissions coefficient for each fuel type to obtain an equivalent CO₂ amount.
- To forecast emissions in future years, the 1998 emission rate per megawatt-hour is multiplied by the forecast generation for the target year.
- Reductions and offsets of CO₂ equivalent are reported as tonnes of CO₂.

GREENHOUSE GAS EMISSIONS



GENERATION GROWTH



Power demands continue to increase. Without SaskPower's voluntary action plan, greenhouse gas emissions for 2000 are estimated to be 14.5 million tonnes.

GENERATION PROJECTS SUMMARY



GREENHOUSE GAS REDUCTIONS

BOUNDARY DAM

	1990	1991	1992	1993	1994	1995	1996	1997	1998	Estimated 1999	2000
Boiler Optimization						27,700	27,700	27,700	27,700	27,700	27,700
Unit 1 •Turbine Overhaul					8,200	8,200	8,200	8,200	10,200	10,200	10,200
Unit 2 •Refurbishment						9,700	9,700	9,700	9,700	9,700	9,700
Unit 3 •Turbine Overhaul					19,000	19,000	19,000	19,000	19,000	19,000	23,000
•Waterlance Addition		4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
•Feedwater Heaters		16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200	16,200
•ID Fan/ Precipitator											3,000
Unit 4 •Turbine Overhaul			25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	30,600
•Waterlance Addition		3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100
•Feedwater Heaters			18,400	18,400	18,400	18,400	18,400	18,400	18,400	18,400	18,400
•ID Fan/ Precipitator										4,000	4,000
Unit 5 •Turbine Overhaul	5,600	5,600	5,600	5,600	5,600	5,600	5,600	13,300	13,300	13,300	13,300
•Economizer Rebuild								12,400	12,400	12,400	12,400
Unit 6 •Turbine Overhaul							13,700	13,700	13,700	13,700	13,700

SHAND

Over-pressure Operation									2,000	2,000	2,000
Economizer Addition						17,200	17,200	17,200	17,200	17,200	17,200
Replace Estevan Generating Station	195,100	195,100	195,100	195,100	195,100	195,100	195,100	195,100	195,100	195,100	195,100

POPLAR RIVER

Sootblower Compressor										2,000	2,000
Unit 1 •Turbine Overhaul					15,100	15,100	15,100	15,100	15,100	15,100	15,100
•Precipitator Controls											4,000
Unit 2 •Turbine Overhaul										24,000	24,000
•Boiler Upgrade										20,100	20,100

LANDIS

Efficiency Improvements										11,000	11,000
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ISLAND FALLS

Unit 1 •Runner Upgrade									6,400	6,400	6,400
Unit 2 •Runner Upgrade									6,400	6,400	6,400
Unit 3 •Runner Upgrade									6,400	6,400	6,400

BOUNDARY DAM~SHAND~POPLAR RIVER

Condenser Cleaning							86,000	86,000	86,000	86,000	86,000
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TOTAL (TONNES OF CO ₂)	5,600	224,500	268,500	310,800	365,400	465,700	485,800	508,400	569,500	585,500
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GREENHOUSE GAS REDUCTIONS



INTERNAL INITIATIVES										Estimated	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Transmission & Distribution								96,000	96,000	96,000	96,000
• Condie/QE										4,400	6,300
• Meadow Lake/Buffalo Narrows											8,000
• Lloydminster/Ermine								35,000	35,000	35,000	35,000
• SCADA system						3,500	3,500	3,500	3,500	3,500	3,500
• Rural lines											
Generation Projects	5,600	224,500	268,500	310,800	365,400	465,700	485,800	508,400	569,500	585,500	
Head Office Upgrade							150	150	150	150	150
Recycling			50	80	100	150	150	150	150	150	150
SUB TOTAL	5,600	224,500	268,550	310,880	369,000	469,500	620,600	643,200	708,700	734,600	
CUSTOMER EFFICIENCIES											
Energy Audits/BEMP	3,200	6,960	11,280	15,280	23,200	23,200	23,200	25,800	28,400	31,000	33,600
Health Care Management								1,600	1,800	1,600	1,600
Ice Rink Program							600	2,000	3,300	4,700	6,000
Watson/Canora			50	50	50	50	50	50	50	50	50
SUB TOTAL	3,200	6,960	11,280	15,330	23,250	23,250	23,850	29,450	33,350	37,350	41,250
OFFSET PROJECTS											
Meridian Co-generation											280,000
Flyash Sales	10,000	9,750	9,600	8,750	13,500	16,500	18,000	31,500	31,800	21,000	28,000
Shand Greenhouse			15,700	15,700	14,800	17,100	20,000	20,000	20,000	20,000	20,000
Prairie Conservation							50,000	50,000	50,000	50,000	50,000
Hybrid Poplar											330
Future GEMCo Projects											57,650
SUB TOTAL	10,000	9,750	25,300	24,450	28,200	33,600	88,000	101,500	101,800	91,000	435,980
TOTAL GREENHOUSE GAS REDUCTIONS (TONNES OF CO ₂)											
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
13,200	22,310	261,080	308,330	362,430	425,850	581,350	751,550	778,350	837,050	1,211,830	

*The energy reduced is converted to an equivalent amount of greenhouse gas using an emission rate of 0.8 kg of CO₂ per kilowatt hour of electricity.

GREENHOUSE GAS EMISSIONS



Carbon Dioxide Emissions (tonnes)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	Estimated	
										1999	2000
Boundary Dam	5,029,000	5,238,000	5,817,000	5,315,000	5,724,000	6,153,000	6,325,000	6,325,000	6,545,900	6,892,000	6,878,000
Poplar River	4,844,000	4,868,000	4,813,000	5,153,000	5,156,000	4,757,000	5,165,000	4,793,000	4,785,400	4,622,000	4,926,000
Estevan	287,000	181,000	52,000								
Shand			866,000	2,095,000	2,285,000	2,102,000	2,318,000	2,391,000	2,291,800	2,421,000	2,018,000
Queen Elizabeth	143,000	150,000	352,000	216,000	341,000	359,000	168,000	493,000	612,700	570,000	268,100
Meadow Lake	10,400	30,200	64,600	27,800	27,600	55,000	42,500	56,700	141,000	81,300	31,200
Landis	20,300	6,700	21,500	15,100	17,700	26,500	24,400	63,800	97,800	34,300	49,800
Success	700	3,900	1,500	1,300	1,500	400	900	3,000	8,200	8,600	600
SUB TOTAL	10,334,400	10,477,800	11,987,600	12,823,200	13,552,800	13,452,900	14,043,800	14,125,500	14,462,800	14,629,200	14,171,700

Methane Emissions (kg)

Boundary Dam	68,900	71,800	79,800	72,900	78,500	84,400	86,700	86,800	90,100	94,600	94,500
Poplar River	76,500	76,900	76,000	81,400	81,400	75,100	81,500	75,700	75,200	73,000	77,800
Estevan	3,900	2,500	700								
Shand			11,700	28,700	31,400	28,900	31,800	33,000	31,500	33,200	27,700
Queen Elizabeth	370	390	900	560	1,810	2,150	430	1,300	6,600	1,500	600
Meadow Lake	30	80	170	70	70	140	110	150	1,500	210	80
Landis	50	20	60	40	50	70	60	160	1,000	350	500
Success	0	10	0	0	0	0	0	10	100	20	0
SUB TOTAL	149,750	151,700	169,330	183,670	193,230	190,760	200,600	197,120	208,000	202,880	201,180
(CO ₂ EQUIVALENT)	(3,700)	(3,700)	(4,200)	(4,500)	(4,700)	(4,700)	(4,900)	(4,800)	(5,000)	(5,000)	(4,900)

Nitrous Oxide Emissions (kg)

Boundary Dam	379,000	395,000	439,000	401,000	432,000	464,000	477,000	477,000	494,400	520,000	520,000
Poplar River	428,000	429,000	426,000	455,000	459,000	419,000	461,000	425,000	422,100	404,000	435,000
Estevan	21,700	13,700	3,900								
Shand			64,500	157,900	172,600	158,700	175,200	181,000	173,200	183,000	152,000
Queen Elizabeth	2,100	2,200	5,100	3,100	10,000	11,900	2,400	7,100	8,900	8,300	3,900
Meadow Lake	150	440	930	400	400	780	620	820	2,000	1,200	450
Landis	290	100	310	220	260	380	350	900	1,400	500	720
Success	10	60	20	20	20	10	10	40	120	120	10
SUB TOTAL	831,250	840,500	939,760	1,017,640	1,074,280	1,054,770	1,116,580	1,091,860	1,102,200	1,117,120	1,112,080
(CO ₂ EQUIVALENT)	(266,000)	(269,000)	(300,700)	(325,600)	(343,800)	(337,500)	(357,300)	(349,400)	(352,700)	(357,500)	(355,800)

TOTAL EMISSIONS (TONNES OF CO₂)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
10,604,100	10,750,500	12,292,500	13,153,300	13,901,300	13,795,100	14,406,000	14,479,700	14,820,500	14,991,700	14,532,400

Greenhouse gases are expressed as an equivalent amount of CO₂ based on their global warming potential: CO₂=1, CH₄=24.5, N₂O=320.

Note: In 1992, Estevan Generating Station was replaced with Shand Power Station.